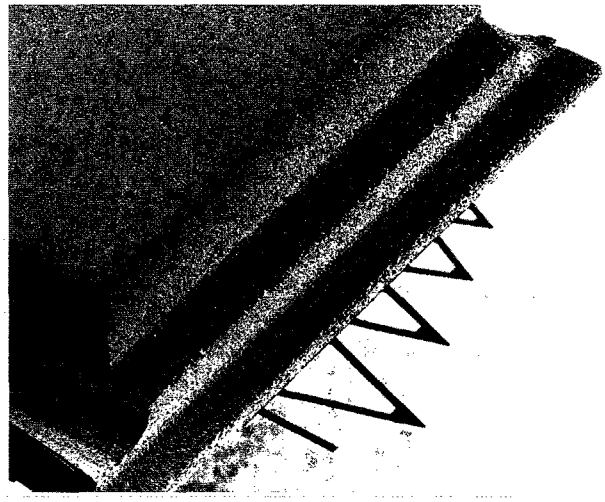
Straight beam wins over cantilevers

In Atomic Force Microscopy, small cantilevers are used to profile surface topography. The V-shaped cantilever was introduced shortly after the invention of the AFM, almost two decades ago, to solve a problem faced by the original rectangular design.

Dr John Sader, at the University of Melbourne's Department of Mathematics and Statistics, and Particulate Fluids Processing Centre, has now used established mechanical principles to prove that the V-shaped cantilevers introduced to minimise the effect of lateral forces on image quality, inadvertently degrades the performance of the instrument. Instead of increasing the resistance to twisting, V-shaped micro cantilevers actually maximise twist.

"This finding is surprising and counterintuitive, contradicting accepted practice and manufacturing standards world wide, where the V-shaped cantilever is the standard due to its alleged advantages," says Sader. "Although the V-shape certainly offers strength and stability in the construction industry, its misuse has had a detrimental effect in the field of nano science."

Users of the AFM have endured the geometric complexity of the V-shaped micro cantilever, with difficulties in calibration and interpretation, to gain improved lateral performance. But Sader calculates that the simple cantilever design of a straight beam proposed for the original AFM offers greatly improved performance, facilitating calibration and measurement interpretation.
His finding is reported in the April issue of *Review of Scientific Instruments.*

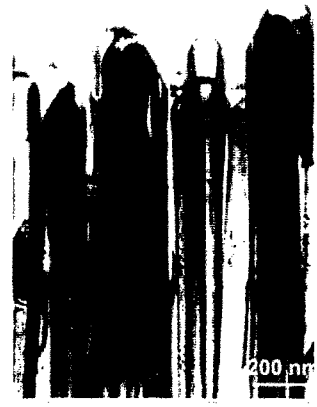


AFM cantilever for profiling surface tomography.

Lost nanowire process

Researchers from the University of California Berkeley and the Lawrence Berkeley US National Laboratory have produced single crystal gallium nitride nanotubes of inner diameters ranging from 30nm to 200mm. The wall thicknesses are 5-50nm. The tubes are produced through epitaxial deposition on zinc oxide nanowires on sapphire wafers. The nanowires are later removed through thermal reduction and evaporation. Electrical and optical characteristics are comparable to those of high quality GaN epilayers grown on ZnO substrates and of GaN nanowires. Tube excitation spectra showed a slight blue shift compared to epilayers, being explained as due to a quantum confinement effect in the thin tube walls (as low as 5nm). Resistance is of the order 10MOhm at room temperature. This increases at lower temperatures. The scientists believe the technique could be used with many other semiconductor systems and could be used practically within five years.

Transparent gallium nitride nanotubes made by depositing the semiconducting material on nanowires and then evaporating the nanowires. The tubes are hollow with capped ends. (Credit: Peidong Yang/UC Berkeley).



Spectroscopy from Jobin Yvon

Jobin Yvon's Optical Spectroscopy diivision has introduced two new instruments, the 750S Scanning Spectrometer and the 750I Imaging Spectrograph.

Both instruments have a 750mm focal length, and are fully automated. They are equipped with an auto-calibrating precision wavelength drive system and an auto-calibrating grating system.

The motorised slits are continually adjustable from 0 to 2 mm in 2 μm steps. The kinematically mounted 110 mm x 110 mm gratings are designed for easy interchange. Controlled with RS232 or IEEE-488 interfaces, both instruments are operational with SpectraMax software and LabView VIs.

Trikon appointment

Dr. Jihad Kiwan has been appointed president and CEO of Trikon Technologies Inc, replacing Nigel Wheeler. Wheeler remains a director and will become vice chairman.

"Nigel Wheeler has served Trikon with distinction over many years and I am pleased that he will remain with us on Trikon's board of directors." said Dr. Dobson, chairman.

Wheeler added: "Dr. Kiwan will bring a commercial focus to Trikon's operations".

Dr. Kiwan was previously senior VP and GM at Amkor Wafer Fabrication Services. Before that he worked for SCI Systems and Hewlett Packard.

Eblana Photonics opts for LDA from Palomar

Eblana Photonics, based in Dublin, Ireland, has purchased a Laser Diode Attach (LDA) automated assembly cell from Palomar. It will be used in Eblana's integrated volume manufacturing line for making lasers for broadband access.

Palomar claims that their LDA completely automates the assembly of laser diode components into the laser diode package with 5 micron accuracy for a controlled and repeatable process. Eblana will use the LDA to package InP laser diode assemblies onto carriers and then to attach them inside an optoelectronic package.